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DENTSPLY INTERNATIONAL INC
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EXAMINER	
DANIELS, MATTHEW J	

ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/685,652	**Applicant(s)** SUN ET AL.	
	Examiner MATTHEW J. DANIELS	**Art Unit** 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2008*.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6 and 7* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-3,6 and 7* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 1-3, 6, and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Waknine (USPN 5348475) in view of Kelly (USPN 2514075), and evidenced by Saracsan (USPN 4452964). **As to Claim 1**, Waknine teaches a method of making a dental device comprising shaping a first light-curable (4:55-64) wax-like (4:5-8, 8:4-6) polymerizable material comprising a mixture of a monomer (4:8-20), oligiomer (3:59-65), and a light sensitizer (6:53-57), the material being dimensionally stable in its uncured state (moldable and workable, 4:6) and optionally a filler (4:21-40) into a set of artificial tooth forming molds to form a set of polymerizable artificial teeth (7:60-8:13). Light curing is applied after the material has been applied ().

Waknine is silent to the step of shaping a second wax-like polymerizable dental material having the claimed composition to form a second portion of a polymerizable dental device having the claimed mechanical properties.

As to the claimed second material, Kelly teaches that it is known to shape a first and second wax-like (6:62-64) polymerizable dental material (Fig. 9, items 44, 45) to leave a composite part capable of subsequent curing (7:50-61). In the combination, it would have been obvious to use the material of Waknine for both first and second materials in view of Kelly's teaching at 7:70-73.

As to the claimed resulting mechanical properties, Waknine teaches materials that are substantially the same as those disclosed in this application. For example, Waknine teaches trimethylhexane diisocyanate (3:47-48), adduct of bisphenol A (3:45-46), and hydroxyethyl methacrylate (3:64-65 and 3:48), in oligomer form (3:62) and a diluent monomer including diisocyanates (4:15-17) and hydroxyethyl methacrylate (4:18-19). In view of these materials, which are substantially the same as disclosed, and the similar high flexure strengths (7:63) of the resulting materials which fall within the range of 7766 to 10,564 psi (9:10-25), it is submitted that the claimed flexural modulus would have also been implicit. As evidence of this position, Saracsan teaches that in preparing a mixture containing an isocyanate and hydroxyethyl methacrylate (2:65-66) a flexural modulus of 394,000 psi was achieved (3:1).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Kelly into that of Waknine because Waknine uses inorganic powder fillers (4:21-42) with acrylates (cols. 3-4) and Kelly specifically teaches that the method should be used with acrylates and inorganic powder fillers (1:50, 6:22-32).

As to Claim 2, it is submitted that the flowable temperature of the first and second wax-like polymerizable materials in the process of Kelly are different and that the first flowable temperature is higher than the second flowable temperature. The second wax-like material is shaped onto a more solid material (Figs. 7-9), which does not deform during the secondary molding process of Figs. 8-9. Therefore, it is submitted that the second wax-like material has a lower "flowable temperature." Additionally, Waknine teaches that viscosity control is well within the skill of the art and may be adjusted by use of diluent monomers (4:5-20), and one would have adjusted the viscosity of the various components such that the enamel portion would be formed first such that it would not be disturbed during secondary molding. **As to Claims 3, 6, and 7**, Kelly teaches a polymerizable dental device of an artificial tooth having a first shaped material as an enamel and a second material which contains a reinforcing filler (7:17-28).

2. **Claims 1-3, 6, and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Waknine (USPN 5348475) in view of Deguchi (USPN 6136886), and evidenced by Saracsan (USPN 4452964). **As to Claim 1**, Waknine teaches a method of making a dental device comprising shaping a first light-curable (4:55-64) wax-like (4:5-8, 8:4-6) polymerizable material comprising a mixture of a monomer (4:8-20), oligiomer (3:59-65), and a light sensitizer (6:53-57), the material being dimensionally stable in its uncured state (moldable and workable, 4:6) and optionally a filler (4:21-40) into a set of artificial tooth forming molds to form a set of polymerizable artificial teeth (7:60-8:13); and

Waknine is silent to the step of shaping a second wax-like polymerizable dental material having the claimed composition to form a second portion of a polymerizable dental device having the claimed mechanical properties.

As to the claimed second material, Deguchi teaches that it is known to provide a second material which is overmolded onto an existing part (Fig. 4) to leave a composite part capable of subsequent curing. In the combination, it would have been obvious to use the material of Waknine for both first and second materials.

As to the claimed resulting mechanical properties, Waknine teaches materials that are substantially the same as those disclosed in this application. For example, Waknine teaches trimethylhexane diisocyanate (3:47-48), adduct of bisphenol A (3:45-46), and hydroxyethyl methacrylate (3:64-65 and 3:48), in oligomer form (3:62) and a diluent monomer including diisocyanates (4:15-17) and hydroxyethyl methacrylate (4:18-19). In view of these materials, which are substantially the same as disclosed, and the similar high flexure strengths (7:63) of the resulting materials which fall within the range of 7766 to 10,564 psi (9:10-25), it is submitted that the claimed flexural modulus would have also been implicit. As evidence of this position, Saracsan teaches that in preparing a mixture containing an isocyanate and hydroxyethyl methacrylate (2:65-66) a flexural modulus of 394,000 psi was achieved (3:1).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Deguchi into that of Waknine because Waknine uses inorganic powder fillers (4:21-42) with acrylates (cols. 3-4) and Deguchi specifically teaches that the multilayer method should be used with acrylates and inorganic powder fillers (Col. 8, 10:12).

As to Claim 2, it is submitted that the flowable temperature of the first and second wax-like polymerizable materials in the process of Deguchi are different and that the first flowable temperature is higher than the second flowable temperature. The second wax-like material is shaped onto a more solid material (Figs. 7-9), which does not deform during the secondary molding process of Figs. 8-9. Therefore, it is submitted that the second wax-like material has a lower "flowable temperature." Additionally, Waknine teaches that viscosity control is well within the skill of the art and may be adjusted by use of diluent monomers (4:5-20), and one would have adjusted the viscosity of the various components such that the enamel portion would be formed first such that it would not be disturbed during secondary molding. **As to Claims 3, 6, and 7**, Deguchi teaches a polymerizable dental device of an artificial tooth having a first shaped material as an enamel and a second material which contains a reinforcing filler (26:23-29, Figs. 3 and 4).

Response to Arguments

3. Applicant's arguments filed 19 March 2008 have been fully considered but they are not persuasive. The arguments appear to be on the following grounds:

a) Waknine teaches that each layer should be partially cured before the next layer of material is applied. Applicants have discovered a different way which uses a wax-like material to form the enamel and dentin portions. These materials are dimensionally stable and maintain their shape when resting in an uncured state at ambient temperature. Applicant's method requires a different order of steps, namely that only after the first and second layers are applied are they fully cured by light radiation.

b) Kelly also teaches polymerizing the first portion before application of the second portion.

c) Saracsan's material does not have a wax-like consistency.

d) Deguchi does not provide any teaching or suggestion of polymerizable wax-like dental materials.

4. These arguments are not persuasive for the following reasons:

a) First, it is noted that this argument appears to be drawn to distinguishing the claimed invention by a particular order of steps (application of resin and curing), however, in the absence of unexpected results, it is submitted that any order of performing the steps disclosed by Waknine would have been obvious. Additionally, Waknine is interpreted to provide that which is claimed because Waknine performs a step of light-curing after the application of the second layer (5:25-27). However, because each layer may be only partly cured (5:18-19) before application of the next layer, it is submitted that both materials are light cured by the application of the second light curing step in the Waknine method. The instant claim does not preclude this order of steps disclosed by Waknine.

Applicants recognize that Waknine provides a paste/resin, but do not address how this is different from the claimed wax-like material. In particular, it should be noted that Waknine teaches a light-curable (4:55-64) polymerizable material comprising a mixture of a monomer (4:8-20), oligomer (3:59-65), and a light sensitizer (6:53-57), the material being dimensionally stable in its uncured state (moldable and workable, 4:6) and optionally a filler (4:21-40). It is submitted that the material disclosed by Waknine is not substantially or significantly different from the instant preparations also using a monomer and oligomer. Additionally, viscosity control and use of fillers are disclosed (4:5-8, 4:21-42), suggesting that the material has the quality of being wax or that its viscosity can be modified such that it is moldable and workable (4:6).

b,d) These arguments are also drawn to an asserted difference in the order of prior art process steps. However, for the reasons set forth above with respect to (a), it is submitted that rearrangement of process steps would have been obvious, and additionally that Waknine teaches the claimed order.

c) Saracsan is provided as evidence only to demonstrate that a claimed property is achievable in the art. It is submitted that the Waknine reference is the most pertinent because it teaches a material which appears to be the same as the disclosed material, and suggests that the claimed properties would have been obvious over the material of Waknine. This position is unrebutted. Saracsan merely provides evidence that the claimed properties can be achieved in a conventional process using materials similar to those of Waknine.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
6/23/08